CLAIMS

What is claimed is:

1. A metal-air battery cell holder for holding at least one battery cell, said holder comprising:

a foldable sheet having a first portion that is substantially aqueous-absorbent, and a second portion that is substantially electrically insulating and aqueous-impermeable;

said sheet being folded into a shape defining at least one recess sized and shaped to accommodate at least a majority of an external surface of said at least one battery cell; and

said sheet being formed such that, when holding said at least one cell, moisture leaking from said at least one cell is absorbed by said first portion and substantially isolated by said second portion.

2. The holder of claim 1, wherein said first portion is an aqueous absorbing surface of said sheet, and said second portion is an impermeable surface of said sheet, and at least a majority of said aqueous-absorbing surface is oriented to face said at least one cell and at least a majority of said impermeable surface faces away from said at least one cell.

3. The holder of claim 1, wherein said sheet is sized and shaped such that said at least one cell is substantially encased by said sheet.

4. The holder of claim 1, wherein said at least one cell includes a metal-air battery cell and said sheet has air-permeable regions that, when said sheet is folded to hold said at least one cell, align with air access openings in said metal-air battery cell.

5. The holder of claim 4, wherein said air-permeable regions are holes.

6. The holder of claim 1, wherein said sheet includes paper or cardboard.

7. The holder of claim 1, wherein said sheet includes felt, sponge, cotton cloth, paper or cardboard.

8. The holder of claim 1, wherein said sheet includes at least one layer of insulating plastic material.

9. The holder of claim 8, wherein said plastic material includes polyethylene, polypropylene, or polystyrene.

10. The holder of claim 1, wherein said sheet is a laminate including at least one layer of aqueous absorbent material and at least one layer of impermeable material.

11. The holder of claim 1, wherein said at least one cell includes cells and said sheet is sized and shaped such that, when folded to hold said cells and when said aqueous-absorbent surface is wetted, a wetted path is defined between adjacent ones of said cells that is substantially longer than a minimum distance between said cells, whereby a short-circuit current potential is reduced.

12. A metal-air battery cell holder for holding at least one battery cell, comprising:

said holding device having a portion including a sheet that is folded into a shape capable of at least partially surrounding said at least one battery cell;

said portion being substantially electrically insulating and aqueous-impermeable; and

said portion being in contact with said at least one battery cell and being effective to retain an aqueous solution in the event of leakage from said at least one battery cell.

13. A metal-air battery cell holder according to claim 12, wherein said at least one cell includes a metal-air battery cell having air access openings and said holding device has a gas exchange portion permitting exchange of gases that align with said air access openings in said metal-air battery cell to permit exchange of gases with an ambient atmosphere.

14. A metal-air battery cell holder according to claim 13, wherein said gas exchange portion includes holes.

15. A metal-air battery cell holder according to claim 12, wherein said second portion comprises an absorbent material.

16. A metal-air battery cell holder according to claim 15, wherein said absorbent material is distributed upon at least one surface of said sheet.

17. A metal-air battery cell holder according to claim 16, wherein said absorbent material is substantially restricted to a single side surface of said sheet.

18. A metal-air battery housing portion for preventing leakage from at least one battery cell, said holder comprising:

a folded sheet capable of at least partially surrounding said at least one battery cell;

a first portion of said sheet being substantially electrically insulating and aqueous-impermeable;

a second portion of said sheet being made of an absorbent material effective to retain an aqueous solution.

19. A metal-air battery cell holder according to claim 18, wherein said housing portion supports said at least one battery cell in a predefined position within a casing.

20. A metal-air battery cell housing portion according to claim 18, wherein said at least one cell includes a metal-air battery cell having air access openings and said holder has a portion permitting exchange of gases that, when said holder is arranged to hold said at least one cell, aligns with said air access openings in said metal-air battery cell.

21. A metal-air battery cell housing portion according to claim 20, wherein said portion permitting gas exchange includes holes.

22. A metal-air battery cell housing portion according to claim 18, wherein said holder includes paper or cardboard.

23. A metal-air battery cell housing portion according to claim 18, wherein said holder includes a laminate of plastic and at least one of paper and cardboard.

24. A metal-air battery cell housing portion according to claim 18, wherein said absorbent material comprises one surface of said sheet, and said holder includes paper or cardboard.

25. A metal-air battery cell housing portion for holding at least one battery cell, said housing portion comprising:

a folded sheet capable of at least partially surrounding said at least one battery cell;

said sheet being effective to retain an aqueous solution;

said sheet supporting said at least one battery cell in a predefined position within a casing.

26. A metal-air battery cell housing portion according to claim 25, wherein said sheet is substantially impermeable to said aqueous solution.

27. A metal-air battery cell housing portion according to claim 25, wherein said sheet is a portion of said housing portion.

28. A metal-air battery cell housing portion according to claim 25, wherein said sheet includes at least one layer of insulating plastic material.

29. A metal-air battery cell housing portion according to claim 28, wherein said plastic material includes polyethylene, polypropylene, or polystyrene.

30. A metal-air battery housing portion for preventing leakage from at least one battery cell, said holder comprising:

a folded sheet capable of at least partially contacting said at least one battery cell;

a first portion of said sheet being substantially electrically insulating and aqueous-impermeable;

a second portion of said sheet being made of an absorbent material effective to retain an aqueous solution.

31. A metal-air battery cell holder according to claim 30, wherein said housing portion supports said at least one battery cell in a predefined position within a casing.

32. A metal-air battery cell housing portion according to claim 30, wherein said at least one cell includes a metal-air battery cell having air access openings and said holder has a portion permitting exchange of gases that, when said holder is arranged to hold said at least one cell, aligns with said air access openings in said metal-air battery cell.

33. A metal-air battery cell housing portion according to claim 32, wherein said portion permitting gas exchange includes holes.

34. A metal-air battery cell housing portion according to claim 30, wherein said holder includes paper or cardboard.

35. A metal-air battery cell housing portion according to claim 30, wherein said holder includes a laminate of plastic and at least one of paper and cardboard.

36. A metal-air battery cell housing portion according to claim 30, wherein said absorbent material comprises one surface of said sheet, and said holder includes paper or cardboard.

37. A method of forming a metal-air battery cell holder, comprising the steps of:

obtaining a foldable sheet having a first portion that is substantially aqueous-absorbent, and a second portion that is substantially electrically insulating and aqueous-impermeable; and

folding said foldable sheet into a shape defining at least one recess sized and shaped to accommodate at least a majority of an external surface of said at least one battery cell;

said shape of said foldable sheet further being such that moisture leaking from said at least one cell is absorbed by said first portion and substantially isolated by said second portion.

38. The method of claim 37, wherein said first portion is an aqueous absorbing surface of said sheet, and said second portion is an impermeable surface of said sheet, and at least a majority of said aqueous-absorbing surface is oriented to face said at least one cell and at least a majority of said impermeable surface faces away from said at least one cell.

39. The method of claim 37, further comprising sizing and shaping said foldable sheet such that said at least one cell is substantially encased by said sheet.

40. The method of claim 37, further comprising aligning air-permeable regions in said sheet with air access openings in said metal-air battery cell.

41. The method of claim 40, wherein said air-permeable regions are holes.

42. The method of claim 37, wherein said sheet includes paper or cardboard.

43. The method of claim 37, wherein said sheet includes felt, sponge, cotton cloth, paper or cardboard.

44. The method of claim 37, wherein said sheet includes at least one layer of insulating plastic material.

45. The method of claim 44, wherein said plastic material includes polyethylene, polypropylene, or polystyrene.

46. The method of claim 37 wherein said sheet is a laminate including at least one layer of aqueous absorbent material and at least one layer of impermeable material.

47. The method of claim 37, further comprising folding and shaping said foldable sheet into a shape such that, when folded to hold a plurality of said cells and when said aqueous-absorbent surface is wetted, a wetted path is defined between adjacent ones of said cells that is substantially longer than a minimum distance between said cells, whereby a short-circuit current potential is reduced.